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MICROPHTHALMUS SIMPLICICHAETOSUS (ANNELIDA: POLYCHAETA), A NEW HESIONID FROM THE NORTHWESTERN AMERICAN PACIFIC COAST WITH EXCLUSIVELY SIMPLE CHAETAE

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Abstract.—The new hesionid species, *Microphthalmus simplicichaetosus,* is described from a sand beach in the Puget Sound, Washington. It differs from the known *Microphthalmus* species in completely lacking compound neurochaetae. The new species is the fourth *Microphthalmus* found on the American northwest Pacific coast.

The hesionid genus *Microphthalmus* Mecznikow, 1865, is distributed worldwide; its species are characteristic faunal elements of tidal and of sublitoral shelly, sandy and sandy-muddy sediments. With one exception, the 27 hitherto known species are typical meiofaunal, mostly interstitial animals revealing a series of morphological and reproductive adaptations to the pore system of sediments (Westheide 1984). Recent unpublished findings suggest that the present number of species is far from complete. Numerous species new to science can be expected. *Microphthalmus simplicichaetosus* is unique within the genus in possessing simple chaetae only. This feature necessitates an emendation of the generic definition as well as of the family diagnosis.

The new species presented here is another result of an ongoing worldwide investigation of meiofauna polychaetes in littoral areas by the senior author. It was found in the course of a sampling tour at the coast of Oregon and Washington in August 1990.

Microphthalmus simplicichaetosus,
new species
Fig. 1A–M

Material examined.—About 20 fixed specimens. U.S. Pacific coast: Puget Sound, Henderson Bay, near Wauna (Washington), 47°20′N, 122°38′W, 17 Aug 1990. Low energy beach with poorly sorted sand and gravel, mixed with organic material. Collected from the upper 10 cm layer where the lower beach slope passes into a sheltered sand flat. Extraction of the fauna was carried out with a $MgCl_2$ solution isotonic to seawater. Specimens were fixed with formalin (10%) or Bouin's fluid.

Type material.—Holotype with 26 chaetigers (length 3.1 mm), immature (USNM 136596). Three paratypes in the Zoologisches Museum der Universität Hamburg (Nr. P-20659) and the remaining specimens in the collection of the senior author.

Description.—Length between 0.77 mm (7 chaetigerous segments) and 3.1 mm (26 chaetigerous segments). Width about 140 μm between the segments and 350 μm when parapodia are included. Almost colorless. Prominent prostomium appears almost completely circular from dorsal view. It joins the following segment by a neck-like constriction. There are 5 tentacular prostomial appendages, 2 of them (=paired antennae) dorsally positioned at anterior margin (length about 80 μm), 2 shorter ones (=palps) arising from the ventral side (length about 60 μm), and 1 unpaired tentacle (=antenna) (length about 70 μm) originating from the

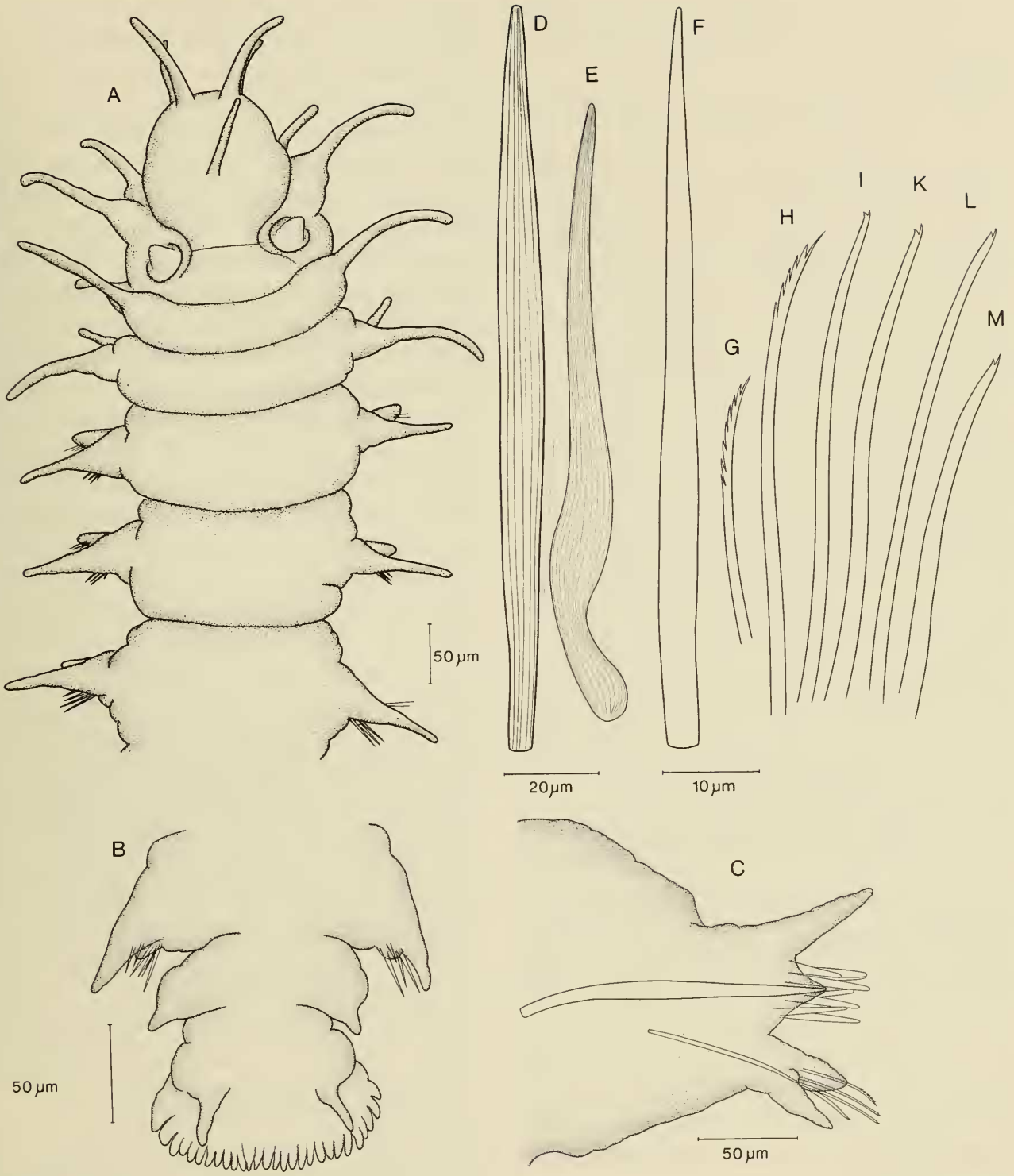

Fig. 1. *Microphthalmus simplicichaetosus,* n. sp. A, Anterior end; B, Posterior end; C, Parapodium from mid-body area; D, Notoacicula; E, Notochaeta; F, Neuroacicula; G, H, Simple serrated neurochaetae; I–M, Simple bifid neurochaetae.

dorsal center (Fig. 1A). Pigmented eyes could not be detected. Two conspicuously protruding nuchal organs situated on first tentacular segment within constriction on both sides behind prostomium.

The 3 following segments are achaetous and each bear 2 pairs of filamentous tentacular cirri. The ventral cirri are considerably shorter than the dorsal cirri. The latter are almost of equal length (about 100 µm), whereas the ventral cirri diminish in length from the first to the third segment

(from about 60 to 30 μm). The first ventral pair is partly drawn anteriorly under the prostomium.

The chaetigerous segments are equally shaped and possess almost identical biramous parapodia (Fig. 1C). The notopodial ramus has a relatively short cone-shaped dorsal cirrus as long as or slightly longer than the neuropodial lobe. Below the cirrus there is a bundle of 7 or 8 more or less parallel notochaetae of almost identical shape. They are very stout and slightly tapering with a smoothly rounded apex. Their basal part is slightly bent with a characteristic subproximal constriction and a following distinct dilatation (Fig. 1E). The size of the notochaetae increases markedly from the first to the sixth chaetigerous segment. There is a very stout, somewhat fusiform straight notoacicula with truncated apex (Fig. 1D), which reaches far into the body.

The neuropodial ramus consists of a conical acicular lobe and a broad cone-shaped cirrus directed ventro-posteriorly that does not extend beyond the tip of the lobe. The neuropodium possesses a bundle of up to seven widely protruding chaetae (Fig. 1C), 1 large, straight acicula (Fig. 1F), and possibly also 1 additional very fine acicula. All neurochaetae simple of 2 types: (1) single dorsal serrated chaeta with 5, 6 or 7 distinct subdistal teeth (Fig. 1G, H); (2) up to 6 regularly distally bifid chaetae (Fig. 1J, K, L), the ventral-most of which is shorter and slightly stouter (Fig. 1M). The area below the subdistal tooth of these chaetae is finely structured but could not be resolved by light-microscopy.

One to 3 terminal posterior segments achaetous. Pygidium with a broad anal plate, bearing numerous marginal adhesive papillae and two usually short anal cirri (Fig. 1B).

Anteriorly papillated pharynx a straight tube without any foldings. It projects backwards to the 4th chaetigerous segment. No genital organs or gametes could be observed in the specimens available.

Discussion.—The relatively small body dimensions, number and arrangement of prostomial appendages, the 6 pairs of tentacular cirri, the shape of the parapodia, and the existence of a one-piece papillated adhesive anal plate are typical features of the genus *Microphthalmus* Mecznikow, 1865. The species presented is very close to *M. hartmanae,* which could be shown in a phylogenetic systematic analysis to be the most primitive species within the genus (Westheide 1977). The nominate subspecies *M. hartmanae hartmanae* Westheide, 1977, from Florida and the *M. hartmanae pacificus* Yamanishi, 1984, from Japan and North China (unpublished observations of Zhao Jing and the senior author) possess similar bundles of numerous, stout, uniform notochaetae. Two of the simple neurochaetal types of *M. hartmanae* are also present in the new species: the subdistally serrated ("pectinate") chaeta and the bifid slightly bent chaetae. *Microphthalmus simplicichaetosus,* however, completely lacks heterogomph falcigerous compound chaetae, which are characteristic of all described *Microphthalmus.* Since compound chaetae are characteristic of hesionid taxa, their lack may be considered to be a highly derived (=autapomorphic) feature of the new species. For its inclusion into the diagram of the phylogenetic relationships of the *Microphthalmus* species (see Westheide 1977, fig. 2), two positions are possible. Either the new species is: 1) the sister group of all hitherto known *Microphthalmus* species; or 2) considered to be the sister species of *M. hartmanae.* The very obvious similarity in chaetation between the two species strongly suggests the latter possibility. The diagnosis of the genus *Microphthalmus* thus must be altered as well as that of the family Hesionidae (e.g., see Pettibone 1982) by the following emendation: The neurochaetae are compound falcigers or spinigers, with the terminal blades long to short; there may be some additional simple neurochaetae, "or neurochaetae may be exclusively simple."

The species presented here is the fourth *Microphthalmus* found on the American northwest Pacific coast. The genus was mentioned by Banse & Hobson (1974) and Kozloff (1987) for this area; Fournier (1991) described three species from British Columbia and Washington: *M. hystrix, M. coustalini,* and one that was not named. Together with the specimens of the new species we found another *Microphthalmus* species in the samples from Puget Sound. The single mature specimen is incomplete and lacks the posterior end with anal plate and anal cirri. The chaetation is highly similar to *M. hystrix* Fournier: it comprises the same type of stout distally bent notochaetae, although in a higher number, and identical neurochaetal types. For the time being, the lack of certain details of *M. hystrix* chaetae does not allow its definite identification.

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